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ABSTRACT

Documented is the deterioration in the job market for college graduates in the early 1970's. It is shown that young male graduates were the group most sharply affected by the changing market and that, under reasonably plausible postulates about future income streams, the rate of return to college has dropped by 2 to 4 percentage points. Evidence shows that the decline in the market for graduates in the 1970's represents a relatively new development that cannot be readily attributed to cyclic changes. The concentration of change among young workers suggests the value of further analysis of the "active market" hypothesis: that shifts in supply and demand have their primary effect on new entrants, who do not hold relatively permanent positions within enterprises. (Author)

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The Decline in the Economic Rewards to College Education

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The Decline in the Economic Rewards to College Education

"The sky is falling down
The sky is falling down
We must run and tell and King
The sky is falling down"
--Chicken Little

The economic rewards of college training, which have been substantial for decades, began to fall at the outset of the 1970s. The once sizeable premium to the college graduate diminished; attainment of professional and managerial job status became less frequent; and the rate of return to the college investment dropped after having risen in the 1960s (Freeman, 1975, 1976). ~~1975; Welch, 1975)~~. In this paper I use information on individuals from the Current Population Survey (CPS) March Consumer income tapes for 1969 and 1974 to examine the dimensions and routes of the decline in the economic value of college training. The 1969 tape contains income from 1968, when the college market was still strong; the 1974 tape contains income for 1973 when the market was weakening. The CPS tape data is supplemented with other statistics which permit some evaluation of developments through 1975. The paper focuses on white men and women, as the market for blacks with college education has been dealt with in detail elsewhere (Freeman 1977). ~~1974; 1976b)~~. Particular attention is given to young persons on the hypothesis that, for reasons to be elucidated later, the market for their services is likely to be especially "active," and thus that declines in the relative position of graduates will be concentrated among them.

The paper is divided into three sections. The first presents reasons for expecting a decline in the economic rewards to college in the 1970s and for expecting the decline to be most severe among the young. Section

II contains an analysis of the CPS data regarding change in the early 1970s and supplementary evidence through 1975. Section III examines the possibility that the developments under study represent normal cyclic changes and then investigates the impact of the changes on potential future income streams and rates of return to the college investment.

There are four principal findings: (1) the economic return to college measured by the income or occupational differences between college and high school graduates fell markedly for young men in the 1970s, a sharp break with past stability that is not readily explained by cyclic developments; (2) among women there was a noticeable fall in the occupational position of graduates but an unclear pattern of change in relative incomes; (3) because of the concentration of the drop in relative incomes among young men, the cross-section age-earnings profiles for college graduates "twisted" in favor of older workers in the 1970s; (4) as a result of the decline in relative incomes and continued increases in the direct cost of college, rates of return to the investment dropped noticeably in the early 1970s.

I. Change in the College Job Market and the Active Market Hypothesis

A deterioration in the economic value of college training has been expected by diverse analysts for many years. J. B. Conant expressed the fear in the 1940s that "we may educate more doctors, lawyers, engineers, scientists, and college professors than our economy can 'support.'"[1] Seymour Harris' book The Market for College Graduates predicted a deterioration in the economic status of graduates in the 1950s and 1960s. More recently, several analysts have expressed surprise at the 1960s stability of relative incomes in the face of substantial increases in supply and sought reasons for the continued high income ratios and rates of return (Miller, 1960; Griliches, 1970).

The main force likely to cause a drop in the rewards to college education -- increases in the supply of graduates -- became especially powerful at the outset of the 1970s. The students from the large demographic cohorts of the 1960s, who had chosen college in unprecedented numbers, presumably because of the booming market for college workers, graduated. From 1967 to 1973 the number of male BA's on the job market (i.e. not pursuing graduate work) increased much more rapidly relative to the work force than in the 1960s when many chose to prolong graduate school.[2] At about the same time, relative demand for graduates began to level off, in part beacuse college manpower intensive sectors such as education and the main R&D performing manufacturing industries were no longer growth leaders (Freeman, 1976). As a consequence the market was ripe for a sharp decline, as in fact will be seen to have occurred.

There are several reasons for expecting such a change to have its most pronounced effect among the young. For one, all new graduates but only a few older workers will be "on the active job market" in a given period, making the position of the former more immediately responsive to recent supply-demand changes.[3] The seasonal concentration of recruiting new graduates, with companies and individuals searching for employees and jobs in the spring and early summer, provides a "bourse" setting that could be expected to yield better information about market conditions and more rapid economic adjustment than does the intermittent movement of experienced personnel. The internal wage structures and employment policies of firms are also likely to make changes easier among new hires than among workers with considerable tenure in the enterprise. The transactions cost of altering the wages or job tasks of experienced workers are likely

to exceed the comparable costs of altering the starting pay or occupational position of new employees. Human capital considerations also suggest greater changes among younger workers, as the firm-specific skills of older employees buffer them from the changing external labor market. All of these factors tend to make the young the "margin of adjustment" to shifts in the state of the job market.

Differences in the skills and job tasks of young and older workers, which make them imperfect substitutes in production, may also lead to very different changes in their economic position in the face of supply or demand shifts. In the case at hand, where the primary cause of change would appear to be the large increase in the supply of young college graduates, it is even conceivable that the position of older graduates would improve while that of the young deteriorates. This would occur if older and younger graduates are complements in production, say because the former supervise the work of the latter. More broadly, to the extent that different cohorts with the same schooling are different inputs, there is a possibility of substantial cohort effects in the wage and job structure: the large graduating classes of the 1970s could suffer from size for their entire work life, while the smaller college cohorts of, say, the 1950s and presumably the 1980s would not. Such an effect implies greater stability in longitudinal earnings and career profiles than in cross-section profiles. Present knowledge of substantial elasticities by age (education fixed) and lifetime career profiles does not permit clearcut evaluation of this possibility.

In terms of the developments of the 1970s, the "active labor market hypothesis" that the position of the young is more rapidly attuned to the changing market conditions than that of experienced personnel

suggests that the most sensitive indicator of change is the relative economic standing of the young. Since, however, the position of young graduates is likely to be more responsive to cyclic as well as longer-term changes than that of older workers, evidence of changes concentrated among the young could reflect normal cyclic forces as well as more fundamental shifts in the supply-demand balance. To differentiate cyclic from noncyclic changes requires explicit analysis of the cyclic sensitivity of the economic position of new graduates as is assayed in section III.

II Evidence of Change in the 1970s

In this section I consider briefly aggregate evidence that at the outset of the 1970s, following a decade or more of boom, the job market for college graduates did in fact undergo a significant downturn, and then analyze the dimensions of this turnaround with the 1969 and March 1974 CPS data sets.

The basic aggregate evidence regarding changes in the income of college graduates is summarized in Table 1, which records real (1967 constant dollar) incomes and salaries of graduates and other workers. Lines 1-6 focus on the annual income of full-time year-round male workers aged 25 and over and 25 to 34 as reported in the Current Population Reports Consumer Income Series. The figures on full-time year-round personnel are a better indicator of wage rates and noncyclic patterns of change than those for all workers. What stands in the data is a marked dip in the college premium. For all men, the ratio of college to high school incomes is off by 11.8 percent (line 3) and the real dollar difference between the income streams down from $4611 (1969) to $3190

Table 1

The Changing Income of College Graduate Workers Relative to Other Workers, 1969-1974,75

Annual Incomes of full-time, year-round workers	Incomes or salaries (in 1967 dollars) and Income Ratios		
	1969	1974-5[a]	Percentage Change
1. 4-year College Graduates, aged 25 and over	~~$13361~~ 13,361	$12194	-8.7
2. High School Graduates, aged 25 and over	8750	9004	2.9
3. Ratio	1.53	1.35	-11.8
4. 4-year College Graduates 25-34 years old	10903	9196	-15.7
5. High School Graduates 25-34 years old	7872	7936	0.8
6. Ratio	1.39	1.16	-16.5
College Starting Rates (monthly)			
7. Accounting	693	615	-11.3
8. Business-General	626	532	-15.0
9. Humanities and Social Sciences	607	494	-18.6
10. Engineering			
Chemical	773	751	-2.8
Electrical	752	678	-9.8
Mechanical	747	704	-5.8
11. Chemistry	706	604	-14.5
12. Mathematics	709	580	-18.2
Other Wage or Salary Series			
13. Hourly Average Earnings			
total private nonsupervisory workers	2.77	2.81	+1.4
contract construction workers	4.36	4.49	3.0
14. Index of real compensation per man hour	105.2	108.9	3.5

Notes Table 1

a) 1974 for lines 1-6; 1975 for lines 7-14.

Source lines 1-6: U.S. Bureau of Census, Current Population Reports,
Consumer Income Series P-60
No. 75, table 47, p. 101
No. 101, table 58, p. 116

lines 7-14: College Placement Council, Salary Survey, Final Report,
July 1975, p. 4, June, 1969, p. 4.
Other wage or salaries from U.S. Bureau of Labor
Statistics, Monthly Labor Review, July 1975,
pp. 85, 88, 107-108 with May 1975 used for 1975;
deflator for 1969 is 109.8 for 1974, 147.7 for
for 1975, 159.3.

(1974). For 25-34 year olds, the drop in the relative income of graduates is more severe, as expected by the active market hypothesis -- a fall of 16.5% in the ratio of incomes and a drop in the constant dollar difference in income streams from $3031 to $1260. A similar pattern of change is found in the income figures for all male workers, including part-time part-year personnel: in 1969 the relevant income ratios were 1.50 (25+) and 1.33 (25-34 age group); in 1974 1.38 (25+) and 1.15 (25-34). Data for other age groups highlights the apparent concentration of the decline among younger men. From 1969 to 1974, the income ratio of full-time year-round college to high school graduates declined by just 2.6% for 35 to 44 year olds, by 7.9% for 45-54 year olds and by 8.4% for 55 to 64 year olds.[4]

The deterioration in the income position of young male graduates is examined further in lines 7-14 which record the starting pay of bachelors men employed in business in 1969 and 1975, deflated by the consumer price index, and other wage and salary series. While average hourly earnings and other comparison series are not directly comparable to starting salaries of graduates, they provide a rough base by which to measure changes in the standing of new college workers.[5] Again, the evidence suggests a significant market downturn, with real starting pay of graduates outside of engineering falling by 10 to 18 percent and in engineering by 3 to 10 percent in the period compared to rough stability in the income of other workers. There is, however, considerable variation in the rate of decline among college workers, with the declines most severe among liberal arts (humanities and social science) and mathematics majors and least among chemical engineers.

The situation of female college graduates is less clear, as published CPS data show only a modest downward trend in the ratio of the

incomes of all college women working year-round full-time to incomes of similar high school women (a ratio of 1.40 in 1969 compared to 1.35 in 1974) but a reasonably sharp drop for younger (25 to 34 year old women), whose relative income declined from 1.42 (1969) to 1.29 (1974)[6] On the other hand, college starting salaries indicate that new female graduates gained in the period relative to their male compatriots[7] while, as will be seen shortly, the 1969 and 1974 March tapes show no deterioration in the income position of young college women but a decline

in their occupational attainment.

CPS March data: Earnings functions

To obtain a more refined measure of the changing economic value of college training, I have analyzed data from the 1969 and 1974 March CPS surveys. These surveys contain information on the yearly wages and salaries and self-employment earnings of about 40,000 men and women in each year. They have the advantage of covering a large population on an annual basis, which permits comparisons over time, and the disadvantage of lacking data on family background, IQ, ability, and the like. The CPS data are used first to estimate semi-logarithmic earnings functions, in which various age or experience groups are treated separately through interaction terms, and then to evaluate changes in the probability of obtaining "college level" jobs.

The earnings function estimates are given in Table 2. For comparability with other studies, the sample excludes persons who were farmers or farm workers or who were self-employed, and persons who are students. The dependent variables are yearly earnings (wage and salary plus self employment income of wage and salary non-farm white males) and weekly earnings, yearly earnings divided by weeks worked. In each regression, dummy variables for the various age-education or experience-education groups are entered, though only the difference between the coefficient for those who completed 4 years of college and those who completed 4 years of high school is reported in the table. The age regressions essentially compare persons from a given high school graduating class who went on to obtain a college degree and persons who ended their formal education with the high school degree. ~~those who did not, while~~ The experience calculations compare persons who could be expected to enter the job market at the same time. Because the Census tapes lack information on experience, I have followed Mincer (1974)

Table 2

Regression Coefficient of the Difference in the Logorithm of Labor Market Earnings, Male Workers, College vs. High School Graduates, by age and 'experience,' 1968-1973[a)]

	White Men				White Women			
	Yearly Earnings		Weekly Earnings		Yearly Earnings		Weekly Earnings	
	1968	1973	1968	1973	1968	1973	1968	1973
Age								
18-24	.19(.04)	.00(.04)	.16(.05)	.06(.04)	.65(.09)	.61(.09)	.50(.08	.45(.06)
25-29	.14(.03)	.03(.03)	.20(.05)	.07(.03)	.46(.07)	.51(.09)	.44(.11)	.36(.05)
30-34	.28(.03)	.25(.04)	.27(.04)	.22(.03)	.27(.10)	.28(.11)	.34(.07)	.26(.07)
35-54	.34(.02)	.38(.03)	.36(.02)	.33(.03)	.30(.06)	.28(.07)	.31(.05)	.25(.05)
55-64	.40(.03)	.34(.04)	.40(.04)	.31(.05)	.33(.01)	.56(.11)	.35(.06)	.48(.08)
R^2	.274	.263	.221	.254	.075	.081	.065	.075
'Experience'								
0-5	.60(.03)	.38(.03)	.45(.03)	.35(.03)	.60(.06)	.67(.08)	.50(.05)	.49(.06)
6-10	.40(.03)	.39(.04)	.36(.03)	.33(.03)	.23(.10)	.37(.09)	.30(.07)	.30(.06)
11-30	.35(.02)	.39(.02)	.33(.02)	.36(.04)	.37(.06)	.32(.07)	.34(.05)	.25(.05)
31f	.36(.03)	.33(.03)	.37(.03)	.31(.04)	.33(.09)	.56(.10)	.36(.06)	.49(.07)
R^2	.285	.266	.266	.255	.078	.080	.065	.075
sample size[b)]	26,950	24,743	-	-	18,831	18,148	-	-

a) All regressions included variables for other age or experience by years of education groups. In each the education groups were 0-7, 9-11, 12, 13-15, 16, 17, and 18+.

b) Persons for whom the imputed years of experience were negative have been deleted from both the age and experience samples for comparability of the samples.

in calculating experience as the difference between age and years of schooling less 6.

The results of the calculations can be summarized briefly. First, with respect to men, there was a marked drop in the effect of college on the earnings of the young or new entrants. In terms of yearly earnings, the college premium drops from .19 to .00 among 18-24 year olds and from .14 to .03 among 25-29 year olds; and from .60 to .38 among those with 0-5 years of experience. The declines in weekly earnings are somewhat less, though still substantial. Second, while there is some indication of a fall in the college advantage among certain groups of older workers, others had a slight increase, giving an overall mixed pattern. The differential change in coefficients by age or experience supports the proposition that the burden of the decline in the college market has fallen largely on new or young graduates. Third, the picture is mixed for women, with no clearcut pattern of decline. The least experienced female group (0-5 years) gains in the yearly but not in the weekly regressions while other age groups also experience diverse changes. Here, large standard errors relative to the changes make the results equivocal.

The finding of a fall in the position of college men and mixed changes for women is consistent, it may be noted, with patterns of change in enrollments through 1974. As a proportion of 18-19 year olds, the number of men going on to college dropped from 1970 to 1974 while the proportion of women did not.[8]

Attainment of "college level" jobs

The downturn in the college job market can be expected to reduce the occupational standing as well as the relative income of graduates. With older workers holding relatively permanent jobs, moreover, the bulk of deterioration in occupational attainment is likely to occur

among new entrants, in accord with the active market hypothesis. Aggregate published statistics and tabulations of the CPS March tapes confirm these expectations. Bureau of Labor Statistics data show, first, a sharp drop in the proportion of male and female graduates holding professional jobs; between 1969 and 1974 the fraction of men with 4 or more years of college fell from 60.9 to 53.0 percent; the fraction of women with 4 or more years of college working as professionals declined from 81.1 to 69.0%. While much of the decline for women was concentrated in teaching where 49% were employed in 1969 compared to just 43.4% in 1974, among men 6.7 points of the 7.9 point fall occurred in nonteaching jobs. While there was some compensatory increase in the fraction of men holding managerial jobs, if one takes professional and managerial occupations as reflecting total "college level" positions, the fraction in such jobs fell from 83.2 to 78.6 percent.[9]

With respect to younger workers the March 1968 and 1974 CPS tapes show a sizeable decline in the proportion of young (25 to 34 year old) male graduates in professional occupations from 52 to 42%. Among new bachelors and other degree recipients, moreover, 28.9% of the men in the class of 1972 were reported to be in nonmanagerial, nonprofessional jobs -- a figure far in excess of that for the class of 1958 over a decade earlier, when the economy was also in a moderate recession.[10]

The impact of the downturn on the differential probability of obtaining a professional job or of ending up in a non-professional /non-managerial position is examined next in Table 3. This table estimates the increment (decrement) in the likelihood of obtaining the specified jobs using linear probability functions, which because the independent variables in the regression analysis are non-overlapping 0-1 dummies, estimate the frequency in the categories and thus are

Table 3

Linear Probability Estimate of the Differential Effect of College Over High School Education on Occupation Standing, 1969-1973

	Male				Female			
	Differential Probability of: Professional Job		Non-Professional/ Non-Managerial Job		Differential Probability of: Professional Job		Non-Professional/ Non-Managerial Job	
	1969	1974	1969	1974	1969	1974	1969	1974
Age								
18-24	.48(.03)	.33(.02)	-.58(.02)	-.42(.03)	.73(.02)	.65(.02)	-.73(.02)	-.66(.02)
25-29	.48(.02)	.35(.02)	-.56(.02)	-.50(.03)	.73(.02)	.59(.02)	-.72(.02)	-.61(.03)
30-34	.36(.02)	.37(.02)	-.51(.02)	-.55(.03)	.62(.03)	.61(.02)	-.64(.03)	-.61(.04)
35-54	.31(.01)	.31(.01)	-.49(.01)	-.51(.02)	.68(.02)	.58(.02)	-.69(.02)	-.57(.02)
55-64	.33(.02)	.32(.03)	-.40(.02)	-.44(.03)	.66(.02)	.56(.03)	-.63(.03)	-.58(.03)
R^2	.290	.289	.28	.287	.413	.374	.356	.334
mean	.15	.15	.72	.71	.15	.16	.81	.79
Experience								
0-5	.49(.02)	.38(.02)	-.62(.02)	-.52(.02)	.72(.02)	.62(.02)	-.73(.02)	-.65(.02)
6-10	.42(.02)	.35(.02)	-.57(.02)	-.53(.02)	.71(.02)	.63(.03)	-.70(.03)	-.65(.03
11-30	.31(.01)	.32(.02)	-.50(.02)	-.54(.02)	.67(.02)	.55(.03)	-.66(.03)	-.59(.03)
31f	.34(.01)	.30(.02)	-.51(.02)	-.45(.02)	.66(.02)	.56(.03)	-.64(.03)	-.56(.04)
R^2	.289	.278	.308	.287	.412	.373	.356	.333

Source: CPS March 1974, March 1969 tapes

not subject to the usual linear probability problems.[11]

While the turnaround in the college market need not reduce the differential probability due to the potential foreclosure of opportunities for the less educated to obtain "college level" positions,[12] the calculations do show a sharp decline in the differential likelihoods, particularly among the young. In 1969, college men with 0-5 years of work experience had a .49 greater chance of being a professional than comparable high school men; in 1974, a .38 greater chance. Similarly, the table shows that among men with 6-10 years of experience ~~had a drop of .07 percent in~~ the differential ~~college advantage~~ probability associated with college fell by 7 percentage points. of professional employment. On the other side of the spectrum, in 1969 college reduced the likelihood of blue-collar and lower-level white collar employment by .58 for 18-24 year olds and by .62 for those with 0-5 years of experience, compared to .42 and .52 reductions in 1974. Among women the results diverge from those in Table 2, as the college advantage in landing professional employment drops among all groups, by as much as 10 percentage points -- a pattern which can be attributed in large measure to the depressed state of the teachers' job market.

To the extent that experience or age-earnings profiles are steeper in professional and related occupations because of greater learning possibilities than in blue collar, sales or clerical jobs, the reduced occupational advantage suggests that if graduates do not move into more traditional college jobs in the future, they are unlikely to obtain as large life cycle income gains as have past generations of graduates.

III Interpretation and Significance

To what extent does the depressed college job market of the 1970s

break with the past? Can the decline in the relative income and occupational position of graduates be attributed to long-run as opposed to cyclic forces? Will the graduates of the period "recoup" their loss of relative income in future years or will their incomes follow historic cohorts' patterns from lower starting positions? Do cross-section profiles provide reliable indicators of possible lifetime income paths and rates of return in a period of sharp market change?

Cyclic and noncyclic components of change

To obtain some quantitative notion of the extent to which the depressed market for college graduates of the 1970s breaks with past developments, I compare changes in income by age for college and high school graduates in the period of decline to changes in previous periods and then examine the cyclic sensitivity of a variety of measures of the relative state of the college job market over post-World War II decades.

Comparisons of the change in income of college and high school graduates in 5 age groups from 1968 to 1973 and in two previous quinquennia -- the immediately preceding period 1963 to 1968 and, to obtain a better fix on cyclic factors, 1956 to 1961 -- are given in Table 4. From 1968 to 1973 the unemployment rate for men 20 years and over rose from 2.2 to 3.2 percent after having fallen from 4.5 percent in 1963, making the 1968-73 and 1963-68 comparison potentially contaminated by differential cyclic conditions. From 1956 to 1961, by contrast, the male unemployment rate rose 3.4 to 5.7, providing a more comparable cyclic pattern.[13]

The calculations reveal a sharp divergence between the early 1970s and previous periods. The data for 1963-68 and 1956-61 confirm the findings of Mincer that college graduates tended to enjoy greater

Table 4

Quinquennial Changes in Constant Dollar Income by Age Group

Age	1968-1973			1963-1968			1956-1961		
	4 years of College	High School	Difference	4 years of College	High School	Difference	4 years of College	High School	Difference
25-29	-5.5	3.8	-9.3	21.0	16.1	4.9	9.7	0.1	9.6
30-34	3.9	6.9	-3.0	19.6	15.9	3.7	6.6	6.3	0.3
35-39	3.1	4.8	1.7	17.8	14.8	3.0	5.3	3.4	1.9
40-44	9.1	11.2	2.1	15.5	14.0	1.5	4.7	3.9	0.8
45-50	9.6	12.6	-3.0	12.6	14.0	-1.4	4.5	4.1	0.4

Note: 1956-61 College change used 4 or more years as 1956 data relate to that group only. Published data are centered at ages 27, 32, 37,42,47.

Source: 1968-1973 from CPS tapes
1963-1968 from U.S. Bureau of Census, Consumer Income Series P-60, No. 92, table 13, pp. 42, 44, table 19, pp. 66, 68
1956-1969 from table 20, pp. 70-71, table 22, pp. 78-79

increases in income than similarly aged high school graduates in those periods (regardless of cyclic developments) especially in the 1960s, whereas the data for 1968-73 reveal a striking reversal in this pattern for the youngest groups. In the period of decline in the college job market, college graduates obtained much lower rates of increase in the 25-29 and 30-34 group than high school graduates -- an apparently unprecedented development of sizeable magnitude.

To obtain a more refined fix on the potential importance of the cycle in the 1970s depressed college job market, I have regressed several measures of the state of the college market on three variables: two highly correlated indicators of the cycle, the deviation of real GNP from its trend level (CYCLE 1) or the rate of male unemployment (CYCLE 2)[14]; a measure of past trends, TIME; and a trend variable beginning in 1970, T70, to reflect the alleged market twist of that period. Because CPS time series data on the relative income of college graduates is spotty, several indicators of the market are examined, including measures of employment in "college level" professional and managerial jobs: the ratio of the starting salary of graduates to annual earnings; the ratio of the income of college graduates to that of high school graduates for male workers 25 and over and 25 to 34; the professional and managerial share of male and total employment; the ratio of professional and nonmanagerial workers to the stock of graduates, and the actual percentage of male graduates obtaining professional or managerial jobs. While none of the specific variables is to be viewed as an optimal measure of the state of the college market place, the set provides a reasonably solid picture of market developments which permit us to factor out at least part of the cyclic and noncyclic

components of change.[15] Because the results with unemployment and the deviation of real GNP from its trend are similar, only two regressions using the former variable are given, simply to document the insensitivity of results to alternative cyclic measures.

There are two findings. First, the cyclic coefficients reveal a general countercyclic movement in the relative position of college graduates. In lines 1-4 the coefficients on CYCLE 1 are negative and that on CYCLE 2 positive, indicating that as GNP rises above its trend level (or unemployment falls), the income of graduates, including starting baccalaureates, relative to that of other workers falls. In lines 5-9, the results are similar with respect to the professional or professional and managerial share of jobs and jobs per graduate; only the percentage of graduate men in professional or managerial jobs, which covers the limited 1961-74 period, has a positive (insignificant) coefficient. These results are, it should be noted, consistent with the general finding of greater cyclic sensitivity in blue than white collar job markets and in skill margins. (Reder, p. 269).

The second result is that in every calculation the T70 variable is significantly negative, which supports the proposition that there was, in fact, a substantial change in the market for graduates which diverged from past trends and normal cyclic changes. Comparison of the T70 and TIME coefficients shows further that the downturn in the market did not simply reduce past upward trends for graduates but caused a sharp deterioration in their economic position. In line 1, for example, the sum of the two trend coefficients is -.035; in line 5, -.018; in line 9, where the rapid growth of the college work force has caused a long term downward trend in professional and managerial employment per

Table 5

Cyclic Factors and the Depressed College Job Market, 1947-1974

log of income and salaries	constant	cycle 1[a]	cycle 2	TIME	T70	R^2
1. College Starting Salary/ Annual Earnings	-.026	-.57 (.16)		.012 (.001)	-.047 (.005)	.900
2. " " "	-.092		.015 (.005)	.012 (.001)	-.048 (.005)	.893
3. Mean Income of 4 Year College Graduates/Mean Income of High School Graduates, Men aged 25+, 1956-74[b]	.30	-.26 (-.26)		.005 (.002)	-.022 (.007)	.48
4. Mean Income of 4 Year College Graduates/Mean Income of High School Graduates, Men aged 25-34, 1956-1974[b]	.16	-.47 (.28)		.006 (.002)	-.038 (.018)	.75
log of employment						
5. Professional share of jobs, male	-2.86	-.45 (.29)		.041 (.001)	.059 (.009)	.977
6. " " "	-2.81		.019 (.011)	.043 (.002)	-.064 (.012)	.958
7. Professional and Managerial share of employment, male	-1.73	-.56 (.09)		.020 (.0004)	-.027 (.003)	.991
8. Professional and Managerial share of employment, total	-1.78	-.45 (.10)		.017 (.0005)	-.021 (.003)	.985
9. Professional and Managerial jobs per college graduate, males (1951-74)	1.00	-.31 (.11)		-.014 (.001)	-.024 (.004)	.982
10. Percentage of Male Graduates in Professional and Managerial Jobs[c], 1961-1974	-.29	.27 (.41)		.003 (.008)	-.032 (.010)	.799

Notes to Table 5

a) The residual from regression of real GNP = 8.02 + .037 TIME
(.008)

R^2 = .989 for the period 1947-1974

b) Omitted 1957, 1959-61, 1963 due to absence of data.

c) Omitted 1960-61, 1963 due to absence of data

Source: GNP, U.S. Department of Labor Manpower Report of the President 1975, Tables G-3, p. 340. College Graduates, Manpower Report Table B-9 pp. 264-5 with 1972-74 adjusted by addition of percentage difference in 1972 between 16+ and 18+ for comparisons with earlier data. College incomes, U.S. Bureau of Census Consumer Income Series P-60 No. 92 Table A, p. 2 with 1965-1967 ungrouped data spliced for consistency with 1967-72 grouped data using 1967 overlap. The missing year 1965 obtained by applying percentage changes in median incomes from 1964 to 1965. 1973 and 1974 from Series P-60 No. 97 and No. 101. Because the 1956 income figures were published only for men with 4+ years of college, I estimated the income of 4 year graduates in 1956 by regressing income for 4 year graduates on income for graduates with 4 or more years and extrapolating with the equation.

College Starting Salaries, from F. W. Endicott, The Endicott Report: Trends in Employment of College and University Graduates (Evanston, Illinois Northwestern University), 1948-75). I took a weighted average of the data with weight .35, .05 20 and 40 for engineering, accounting, general business, and sales. Average annual earnings from U.S. Department of Commerce, Survey of Current Business, July editions, with 1973 and 1974 estimated by applying percentage growth of average hourly earnings from U.S. Department of Labor Monthly Labor Report, Sept. 1975, Table 14, p. 89. Professional and Managerial Jobs from Manpower Report 1975, Table A-15, p. 225 and Manpower Report of the President 1962, Table A-7.

college worker, the rate of deterioration nearly tripled (-.014 to -.038); and so forth. Because of the countercyclic movement in the college market place relative to other job markets, the picture of deterioration in the relative position of graduates in the 1970s is enhanced by the cyclic adjustments. The analysis of changes in income from 1968 to 1973, 1974 and especially 1975 in section II, which do not adjust for cyclic changes, are more likely to understate than overstate the quantitative dimensions of the market turnaround. These results do not of course imply that the depressed college market of the 1970s represents a relatively long term change in the job market: the downturn of the 1970s could differ from previous cyclic patterns; the change could involve noncyclic but temporary changes.[16] Given, however, the significant growth of the college work force and accompanying levelling in relative demand for graduates (Freeman, 1976), an interpretation of the changes in terms of fundamental supply and demand shifts is not unreasonable.[17]

Future income streams

The concentration of the decline in the relative income of graduates among the young, with the resultant "twist" in cross-section age-earnings profiles, raises questions about the appropriate assumptions used to generate future incomes and calculate rates of return. Future income streams and returns are forward-looking concepts that require implicit (as in the case of usual cross-section analysis) or explicit forecasts of future market possibilities. In the past, when the college market was reasonably stable, cohort and cross-section profiles were quite similar (Mincer, pp. 77-79), so that it did not greatly matter whether incomes were assumed to grow at cross-section or past cohort rates. With the depressed market for the young, however, the situation is different, for the 1973 cross-section

profile is much steeper than similar ones generated by applying cohort increases to the starting position of 1973 young graduates.

If the relatively lower income of young male graduates resulted from greater investment in the on-the-job training, rapid income gains in the future might be expected and the cross-section profiles would be appropriate. The evidence on occupational position and on other aspects of labor market performance, such as unemployment (which stood at over 15 percent for liberal arts majors in the class of 1972)[18] is more suggestive, however, of reduced rather than greater investment in skills. Similarly, if the job market for graduates improves in the near future for cyclic or other reasons and those who have experienced the weak market of the seventies recoup some of their relative losses, the cross-section profiles might provide good forecasts of the future. If, on the other hand, the market for graduates does not improve and if the income experience of those graduating in the 1970s follows that of past graduates, cohort income profiles will provide a better guide to market developments.

Some notion of the range of possibilities and the extent of divergence between the 1973 cross-section and other potential life-cycle profiles are given in table 6 which compares the possible 1978 income of men aged 25-29, 30-34, 35-39, 40-44 in 1973 on the basis of several alternative assumptions: 1) That their incomes increase in accord with the 1973 cross-section profile; 2) that they increase in accord with 1968 profiles; or that they increase at 3) 1968-73 cohort and 4) 1963-68 cohort rates of gain. The cross-section figures are calculated by applying the rate of increase in incomes of persons in the next five year age bracket to the income of persons in 1973; the cohort figures apply actual cohort income gains (in constant dollars) of persons who aged five years to the same initial incomes. ~~I have not adjusted~~ the cross-section data have not been adjusted for potential general growth of real income. Thus

Table 6

Potential Future Income Streams by Age, 1973-1978

Age	actual 1973 earnings	Potential Earnings, 1978, using 1973 Cross-section	1968 Cross-section	1968-73 Cohort Gains (in constant	1963-68 Cohort Gains 1967 dollars)
25-29 years					
college	$10242	15113	13579	11630	15949
high school	9702	11618	11282	9953	13860
ratio	1.06	1.30	1.20	1.17	1.15
30-34 years					
college	15113	17684	17540	18375	21166
high school	11618	11827	12266	12641	15259
ratio	1.30	1.50	1.43	1.45	1.39
35-39 years					
college	17684	18265	17214	19134	22936
high school	11827	12680	11997	13067	14616
ratio	1.51	1.44	1.44	1.46	1.57
40-44					
college	18265	18806	19067	20903	22171
high school	12680	12945	12546	14123	14879
ratio	1.44	1.48	1.52	1.48	1.49
45-49					
college	18806	18194	18867	19946	21398
high school	12945	12315	12784	13863	14437
ratio	1.45	1.48	1.48	1.44	1.48

Source: 1973, 1968 March CPS Tapes
1963-68 Cohort gains U.S. Bureau of Census, Current Population Reports
Consumer Income Series P-60
No. 92, table 19, pp. 66, 68, 46, 48.

the ratios of college to high school incomes rather than the actual incomes should be compared. What is most striking in the table is the divergence of the 1973 cross-section from either the 1968 cross-section or the ~~change-in-~~ cohort income profiles. If 25-29 year olds follow the 1973 cross-section, their incomes will increase to yield a college-high school differential of 30 percent in 1978. If they follow the 1968 cross-section or previous cohort profiles, the college men will obtain incomes 15 to 20 percent above those of high school men. Similarly, among 30-34 year old workers, the 1973 cross-section yields markedly higher income ratios than predicted by other assumptions. The reason is that the young groups are starting their careers with considerably compressed income ratios, which require unprecedented income gains to reach the relative position of older graduates. The sizeable divergences among the young mean that discounted present values and rates of return will differ (in ways they did not in the past) depending on postulates about future income profiles. The 1973 cross-section profile will yield higher estimates of rates of return than any of the other assumed ratios since it, in essence, postulates that the young will recoup the losses of the past quinquennium and enjoy more rapid growth of income as they age than previous groups.

Lifetime incomes and rates of return

Crude estimates of discounted lifetime incomes and internal rates of return for persons aged 25 to 29 in 1969 and 1974 (and 24 to 28 in 1968 and 1973) under alternative assumptions about future income streams are given in Table 7. Line 1 gives results using the 1973 cross-section for 1973 and the 1968 cross-section for 1968. Line 2 gives results applying the 1968 cross-section to both years. Line 3 presents similar estimates using actual 1963-73,

Table 7

Estimated Discounted Present Values at Age 18

and Internal Rates of Return, 1968-1973

	Discounted Present Values with 10% Interest (in thousand of 1973 dollars)						Approximate Rates of Return (to 1/2 Percent)			
							Social		Private	
	High School 1968	College 1968	Cumulated Direct Cost of College 1968	High School 1973	College 1973	Cumulated Direct Cost of College 1973	1968	1973	1968	1973
Assumed Income Path										
1. Actual cross-sections with 1.5% growth	99.1	114.0	6.9	105.5	116.1	8.7	13%	10.5%	12.5%	10%
2. Applying 1968 cross-section to 1973 initial conditions with 1.5% growth	99.1	114.0	6.9	104.2	107.2	8.7	13%	8.5%	12.5%	8.0%
3. 1963-1973 cohort changes	97.6	111.2	6.9	102.3	104.6	8.7	12%	9%	11%	7.5%

Notes: Lifetime income streams obtained

line 1 Using actual CPS cross-sections, with incomes interpolated by five year intervals from age group 24-28 and 1.5% annual growth

line 2 Using 1968 cross-section, with 24-28 year old incomes in 1973 as starting point for life-cycle gains and 1.5% annual growth

line 3 Applied 1963-1973 cohort changes to 24-28 year old incomes in 1968 and 1973.

Cost of college, obtained by dividing educational and general income less scholarship aid as reported in U.S. Office of Education, Digest of Educational Statistics 1974, table 125, page 110 by enrollments, table 87, p. 75.
1971-72 data used for 1973 group; 1967-8 and 1965-6 average used for 1968 group so that figures relate to costs 2 years earlier in both cases. I assume some cost for the four years, although more realistic analysis would adjust costs for time trends.
Cost of books and transportation from U.S. Bureau of Census, Current Population Reports, Series P-20, No. 281, "Income and Experiences of Students Enrolled in post-secondary schools: October 1973", p. 4, table E.
After tax incomes for private returns, obtained by adjusting incomes by tax liability reported in U.S. Bureau of Census, Statistical Abstract 1973, p. 395 table 631 with interpolations between income categories.I used the married couple, independent incomes tax liabilities.
Private cost of college data obtained from SeriesP-20, No. 281, p. 4 Table F, figures for full time male students in 4 year colleges and universities. I adjusted these figures to 1971 and 1976 on the basis of changes in median tuition and fees reported in U.S. Office of Education, Digest of Educational Statistics, 1974, tables 127, 128, p. 113.

cohort income gains. In each case the income profiles were generated by applying the relevant change in incomes to the incomes of 25-29 year olds in five intervals. That is, I estimate the income of 30-34 year olds by multiplying the income of 25-29 year olds by the life cycle growth over five years and then take that figure, multiply it by the life cycle growth from 30-34 to 35-39 to obtain the next figure, and so forth. In intermediate years, I interpolated by simple linear procedures. For comparability, except in line 1, I apply the same income profile to both the 1968 and 1973 groups of graduates. To take account of the years in school, I tabulated from the CPS tapes the income of men, by individual year, in-school and out-of-school and used the relevant figures.[19] Public cost figures are obtained by dividing educational and general income less scholarship funds by number of students and relate to the period 2 years preceding the year of analysis, so as to be roughly coincident with the foregone income figures. Private benefits are obtained by applying tax rates to incomes and ~~with estimates of~~ private costs from a special Ontario survey of the costs of college, as described in the table note. To focus on the effect of the post-school labor market changes on the return, I keep the same cross section profile estimates for the years 18 to 23. This could be modified in the cohort calculations to obtain a better fix on either historic returns or potential future returns. Finally, the cross-section estimates are adjusted for potential increases in real income in the future by a growth factor of 1.5 percent per annum. Larger or smaller factors will alter the estimated present values and returns but not the substantive results. Since cohort incomes are based on actual income gains, no such adjustment is made in line 3.

The computations show that the compression in the college premium and increased cost of college reduced the net income value of training and the

interval rate of return. The smallest drop occurs in line 1, where it is assumed that the young graduates of the seventies will obtain exceptional cohort income gains in the future and to attain the premiums of older generations found in the 1973 cross-section. Even here, however, the rate of return falls by about 2 1/2 percentage points. Under the other -- and potentially more realistic -- assumptions, the return is estimated to fall from 3 to 4 1/2 points. If the 1963-73 decadal cohort changes in income is taken as the 'best' estimate of possible long run developments the social rate is estimated to fall from 12% to 9% and the private rate from 11% to 7%. In these cases, the young do not recoup the loss in relative income of the 1970s.

All of the calculations in the table are to be viewed as rough order of magnitude estimates based on alternative future possibilities. Whether de facto any of these rates turns out to be correct depends on future economic developments which are difficult to forsee. The most recent statistics on usual weekly earnings show that from 1973 to 1975 the earnings of 25-29 year old male college graduates rose by 10.9% compared to an increase of 14.6% for male high school graduates.[20] Since the direct cost of college has continued to rise (U.S. Office of Education, Digest of Educational Statistics 1974, tables 127, 128, p. 113) the return has presumably dropped further in the 1973-75 period, perhaps by as much as 1 additional percentage point. On the other hand, forecasts of future starting salaries suggest that the job market for graduates will begin to improve relative to that of other workers in the 1980s (Freeman, 1976b). What is needed but currently lacking is a complete econometric forecast model in which to imbed rate of return computations.

Conclusion

This paper has documented the deterioration in the job market for college graduates in the early 1970s. It has shown that, ~~consistent with the "active market" hypothesis,~~ young male graduates were the group most sharply affected by the changing market and that, under reasonably plausible postulates about future income streams, the rate of return to college has dropped by 2 to 4 percentage points. It has presented evidence that the decline in the market for graduates in the 1970s represents a relatively new development that cannot be readily attributed to cyclic changes. ~~The causes and likely future state of the college job market, which are analyzed in detail elsewhere (Freeman, 1975, 1976b), have been ignored to focus on these dimensions of change.~~

The concentration of change among young workers suggests the value of further analysis of the 'active market' hypothesis that shifts in supply and demand have their primary effect on new entrants, who do not hold relatively permanent positions within enterprises.

Footnotes

[1]The Conant quote is from J.B. Conant, Education in a Divided World (Harvard University Press, 1948), p. 198.

[2]Estimates given in R. Freeman "Overinvestment in College Training?" Journal of Human Resources, Summer 1975, Table 6 actually show a drop in the number of male graduates on the job market in the 1960s. Alternative estimates based on other data show a 7.6% increase in graduates per worker from 1967 to 1973 compared to a 1.2% increase from 1969 to 1967. See R. Freeman The Overeducated American (Academic Press), Chapter 3.

[3]The argument that the market for new entrants is especially active has been advanced by Reder among others. In cobweb models of the professional job market, starting salaries have been found to be highly sensitive to changes in supply and demand for specialists (Freeman, 1971). See the reference therein.

[4]These data are taken from U.S. Bureau of the Census, Consumer Income Series P-60, No. 75, table 47, pp. 101-102 and No. 101, table 508, pp. 116-117.

[5]The problem is that the position of new high school graduates may also have deteriorated in the period. For those obtaining jobs, however, as sharp a deterioration as occurred among college men is unlikely, even in the weakened job market of the 1970s. For comparison with the starting pay, we need a series of starting rates for high school workers, which is currently unavailable but potentially retrievable from Current Population Reports data tapes which cover work experience.

[6]The data for women are also from Series P-60, No. 75, table 47, p. 105 and No. 101, table 58, p. 120.

[7]Starting salary figures are given in the annual report of F. W. Endicott Trends in Employment of College and University Graduates in Business and Industry (Northwestern University, Evanston Illinois) 1969, pp. 4-5; 1975, p. 4,6. In 1975 women earned somewhat higher salaries in several fields than men in contrast to a sizeable male premium in 1969.

[8]According to Bureau of Census estimates in Series P-20 "School Enrollments -- Social and Economic Characteristics of Students -- October 1974," No. 278, the number of 18-19 year old women in college increased from 1970 to 1974 while male enrollments fell, leading to 6% more 18-19 year old women than men in college. See table 4, p. 5.

[9]Data from U.S. Bureau of Labor Statistics, Special Labor Force Reports, Educational Attainment of Workers, No. 175, table I, p. A-18, No. 125, table I, p. A-28.

[10]U.S. Bureau of Labor Statistics, Employment of Recent College Graduates October, 1972, Special Labor Force Report 169 Table 2, p. 35. The comparisons refer to National Science Foundation Two Years After the College Degree, table 32, p. 46 where 19.3% of bachelors graduates were reported in non-managerial or non-professional jobs.

[11]Since the explanatory variables are orthogonal, the estimates are simply the cell frequencies, which could otherwise be obtained by multiple contingency tables. The standard errors, which depend on the overall fit of the equation, are however not appropriate measures of the standard error in the cell frequencies, which depend on Census sampling properties, as given in the detailed descriptions of the Current Population Reports surveys.

[12]R. Freeman, "The Effect of the Increased Relative Supply of College Graduates on Skill Differences and Employment Opportunities" (Harvard Institute of Economic Research Study Paper Number 485), pp. 22-33.

[13]U.S. Department of Labor, Manpower Report of the President 19 4, table 59, p. 143.

[14]The deviation of real GNP from its trend is correlated at 0.95 with the unemployment variable.

[15]Each of the measures has some problems. As noted earlier, the comparison of college starting rates to annual earnings is made only because of the universality of figures on starting high school rates. The CPS figures skip various years and show some jumpiness presumably because of sampling error. The employment data do not take account of the fact that many of the technical and kindred jobs in the one-digit professional grouping are not 'college level' positions, as also is true of many managerial positions. What the regressions do is enable us to eliminate some of the cyclic change in these admittedly imperfect variables but do not of course provide more adequate measures of the market place.

[16]Because of the reported decline in the SAT scores of college applicants, the drop in the relative income of graduates might partially reflect changes in ability. However, the 25 to 29 age group in 1973 applied to college 7 to 11 years earlier -- that is roughly in 1962 to 1966, which precedes the major fall in SAT scores. Hence, it is unlikely that much of the observed change in income ratios can be attributed to a drop in the relative ability of graduates.

[17]Such an interpretation is assayed in The Overeducated American.

[18]U.S. Bureau of Labor Statistics, Spcial Labor Force Report 169, op. cit. table 1, p. 34.

[19]Specifically, for ages 18 to 21, college men are given the income of college

students while high school men are given the income of high school graduates out-of-school. For the year 22 (when college men presumably work part year) they are both given the income of out-of-school men. Incomes at age 23, 24, are obtained by extrapolating the change in income from the 24-28 to 24-33 to the income in the midpoint year 26. The actual reported incomes during school are roughly equal to the one-fourth assumed in most previous computations.

[20]These data were tabulated from the May 1973 and 1975 Current Population Survey reports.

Bibliography

1. Freeman, R., "Overinvestment in College Training?" Journal of Human Resources, summer 1975, pp. 287-311.

2. Freeman, R., The Overeducated American (Academic Press, 1976).

3. Freeman, R., Black Elite (McGraw-Hill, 1977).

4. Freeman, R., "The Effect of the Increased Relative Supply of College Graduates on Skill Differences and Employment Opportunities" (Harvard Institute of Economic Research Study Paper Number 485), pp. 22-33.

5. Griliches, Z., "Notes on the Role of Education in Production Functions and Growth Accounting," in Education, Income and Human Capital, W.L. Hansen (ed.), New York: N.B.E.R., 1970.

6. Harris, Seymour, The Market for College Graduates (Harvard University Press, 1949).

7. Miller, H.P., "Annual and Lifetime Income in Relation to Education: 1939-1959," American Economic Review, Dec. 1960, pp. 962-986.

8. Mincer, J., Schooling Experience and Earnings (National Bureau of Economic Research, 1974).

9. Reder, M. "Wage Structure: Theory and Measurement," in Aspects of Labor Economics (NBER), Princeton University Press, 1962.